



# Perspectives of GPM Ground Validation in Germany

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# Perspectives of GPM GV in Germany

- Operational DWD rain gauge and weather radar networks provide high quality precipitation measurements suited for GV within whole Germany.  
→ National network application
- DWD operates the GPCC (global precipitation climate center)  
→ Network application
- Research institutions operate super sites at various locations and are involved in the development and validation of GPM precipitation algorithms.  
→ Physical validation

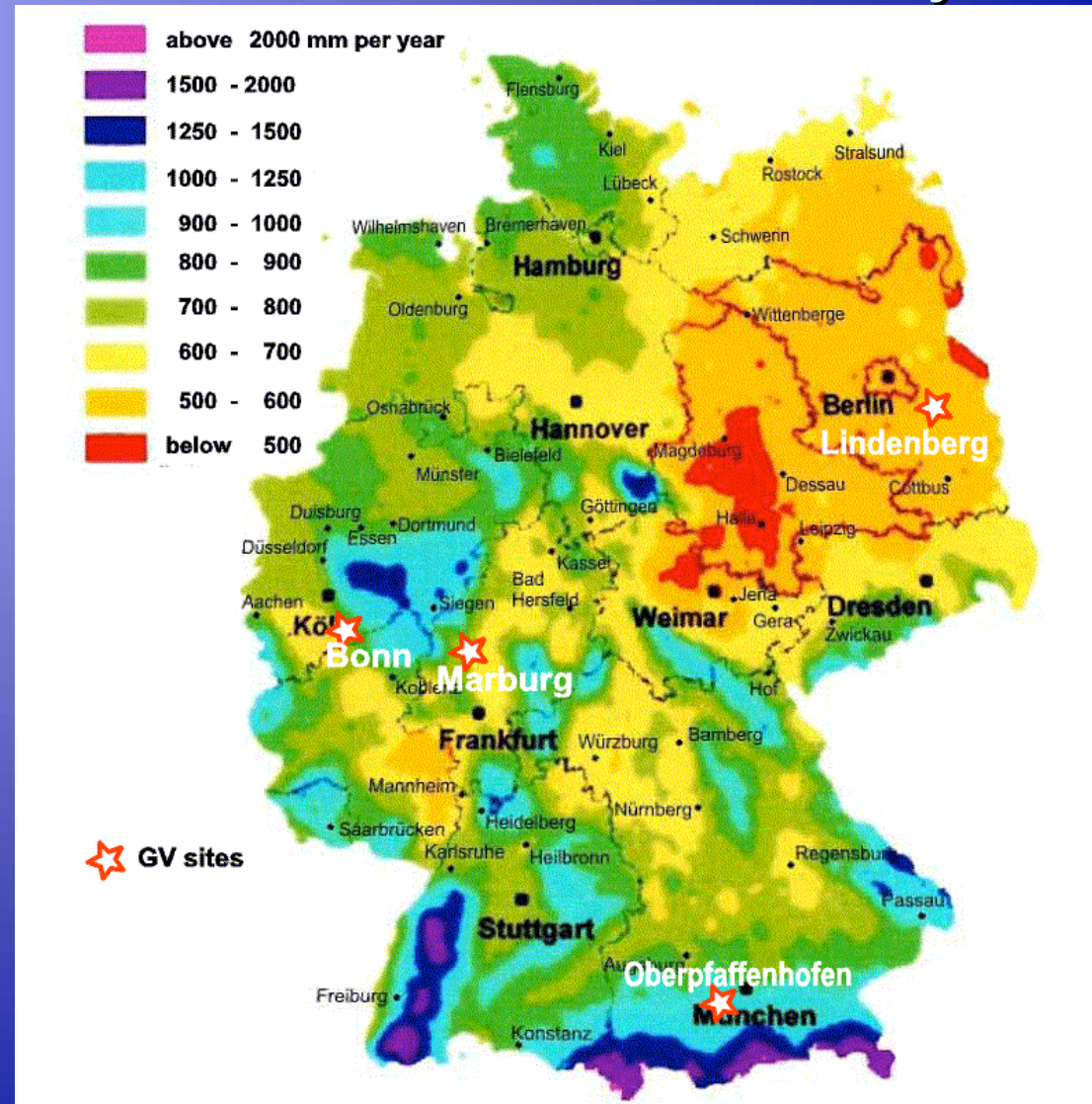


# Germany

Germany covers a wide range of precipitation situations: drizzle, long lasting stratiform, severe convective, snow

4 sites have potential to act for GV:

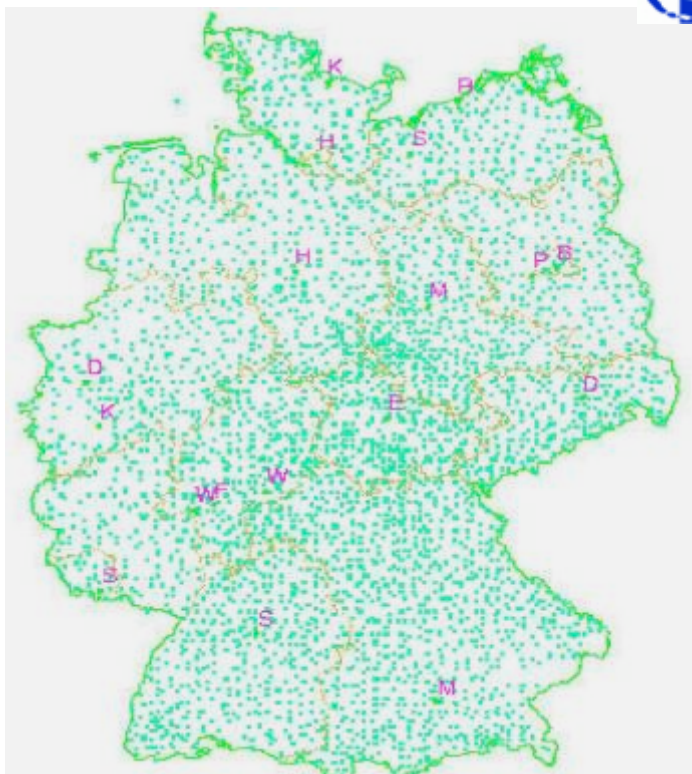
- Lindenberg (DWD)
- Bonn (University)
- Marburg (University)
- Oberpfaffenhofen (DLR)





# DWD Operational networks in Germany

## rain gauge network

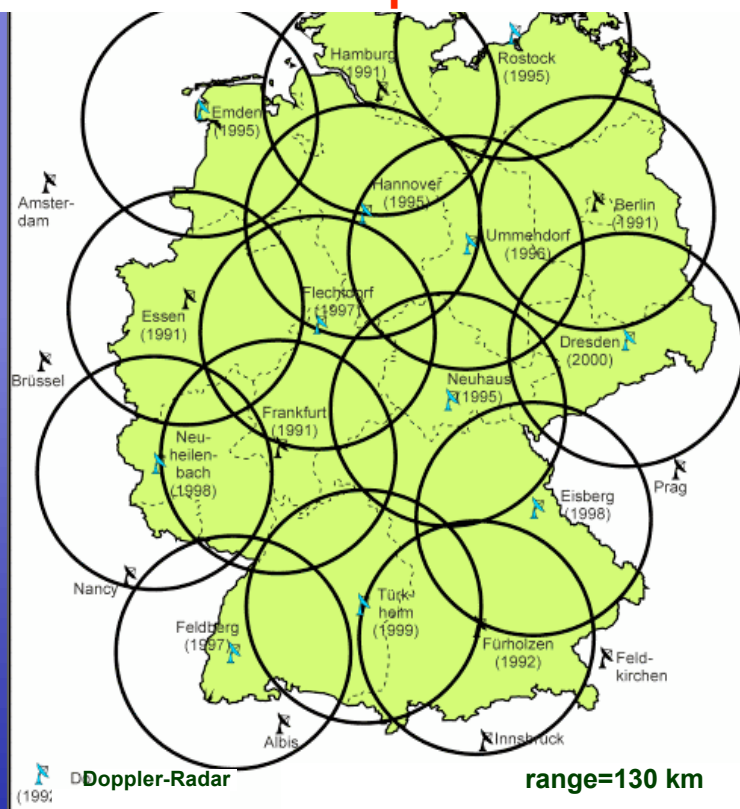


about 3000 stations with 24h-accumulated precipitation measurements, including about 1300 automatic 1 minute resolution gauges

## 16 C-band Doppler radar network



**all radars will be polarized in 2011**

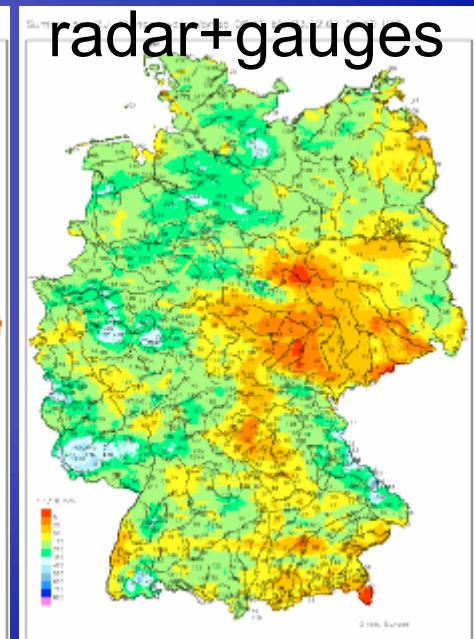
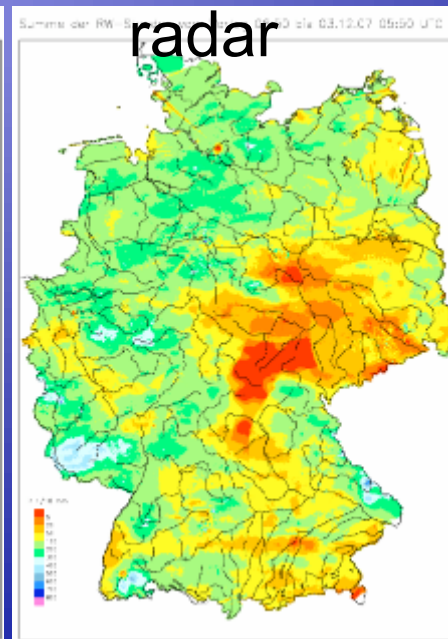
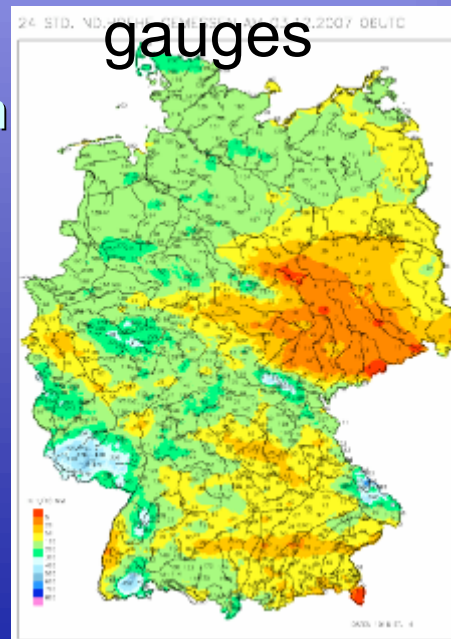




# DWD Operational Radar Product

## RADOLAN: radar online calibration

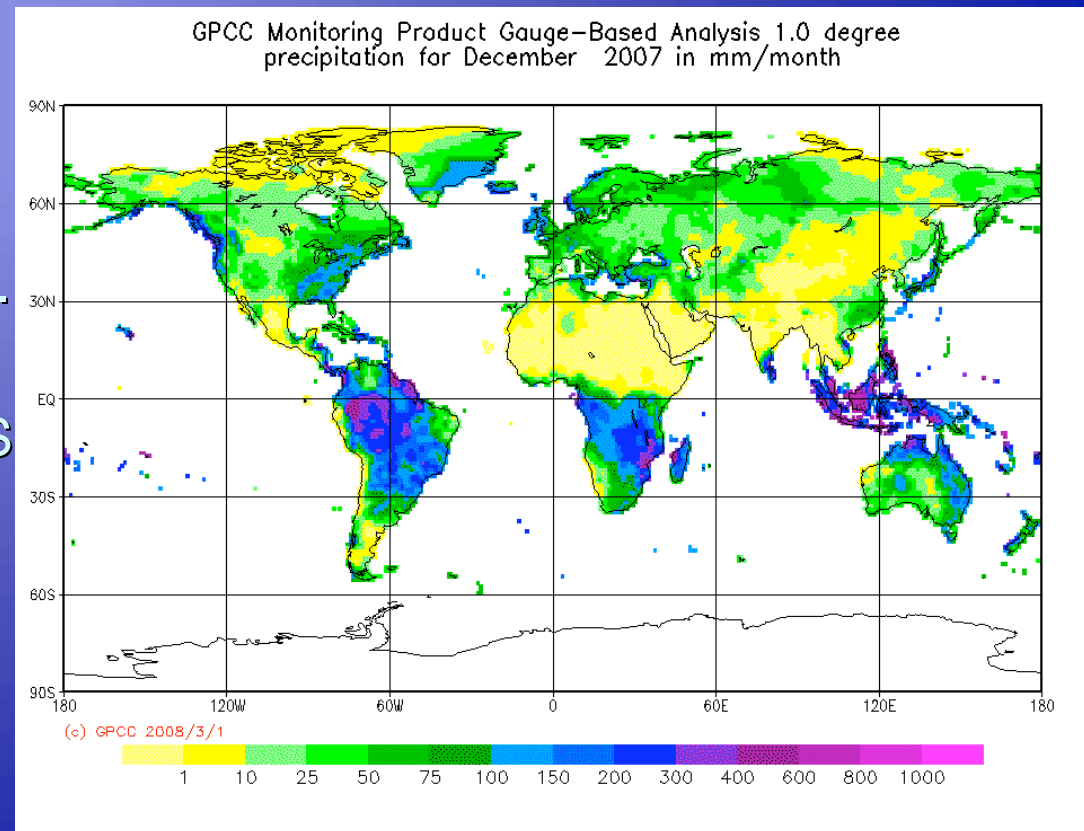
- Automatic calibration of radar observations by automatic rain gauges. Available hourly.
- Covers Germany, will be extended with neighboring radars and gauges.
- Example  
24 hour sum





# DWD Global Precipitation Climate Center

- DWD operates the Global Precipitation Climate Center (GPCC)  
→ <http://www.dwd.de/en/Funde/Klima/KLIS/int/GPCC/GPCC.htm>
- Provides global (land) gridded ( $1^\circ$ ) precipitation estimates, currently monthly, daily is planned.
- Cooperation with HOAPS (Hamburg Ocean Atmosphere Parameters and Fluxes from Satellite Data) to provide global (land + ocean) products.

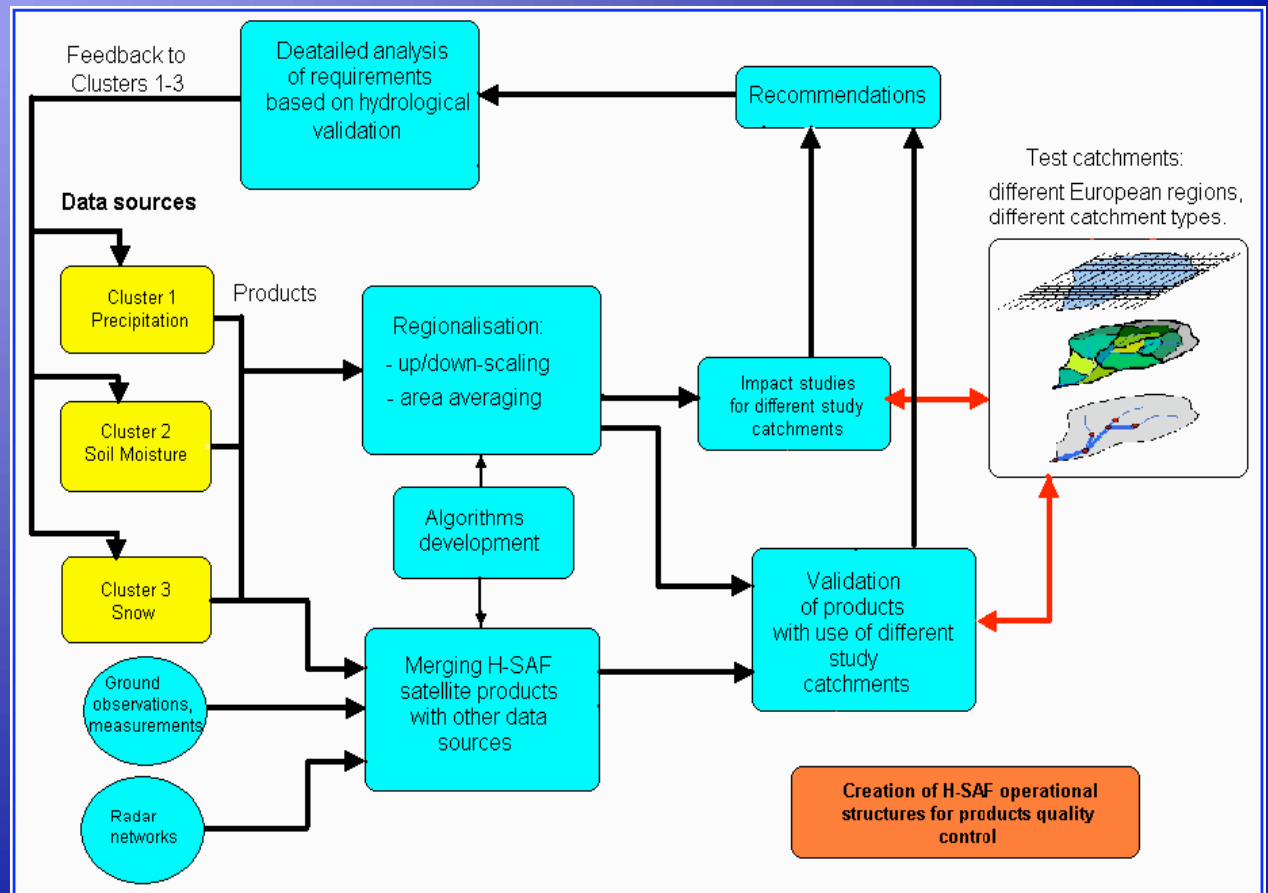




# DWD H – SAF

## Hydrology – Satellite Application Facility

- H-SAF is a EUMETSAT activity to provide remote sensing data for the estimation of precipitation, snow and soil moisture for operational applications.
- Will be operational in 2010.
- DWD contributes to the validation of the products.
- Cooperation with CM-SAF.





# Instrumentation of Supersites

The proposed supersites have excellent instrumentation and are well experienced in the development and operation of the systems and the organization of field campaigns.

- Radar systems (C, X, Ka, W - Band), scanning & vertical pointing
- Multi-frequency radiometer systems
- Lidar systems, ceilometers
- Windprofiler, RASS, Sodar
- Surface observations
- Disdrometers, rain gauges
- Rain gauge networks
- Operational radio sondes nearby
- Lightning detection systems
- Research aircraft
- ...

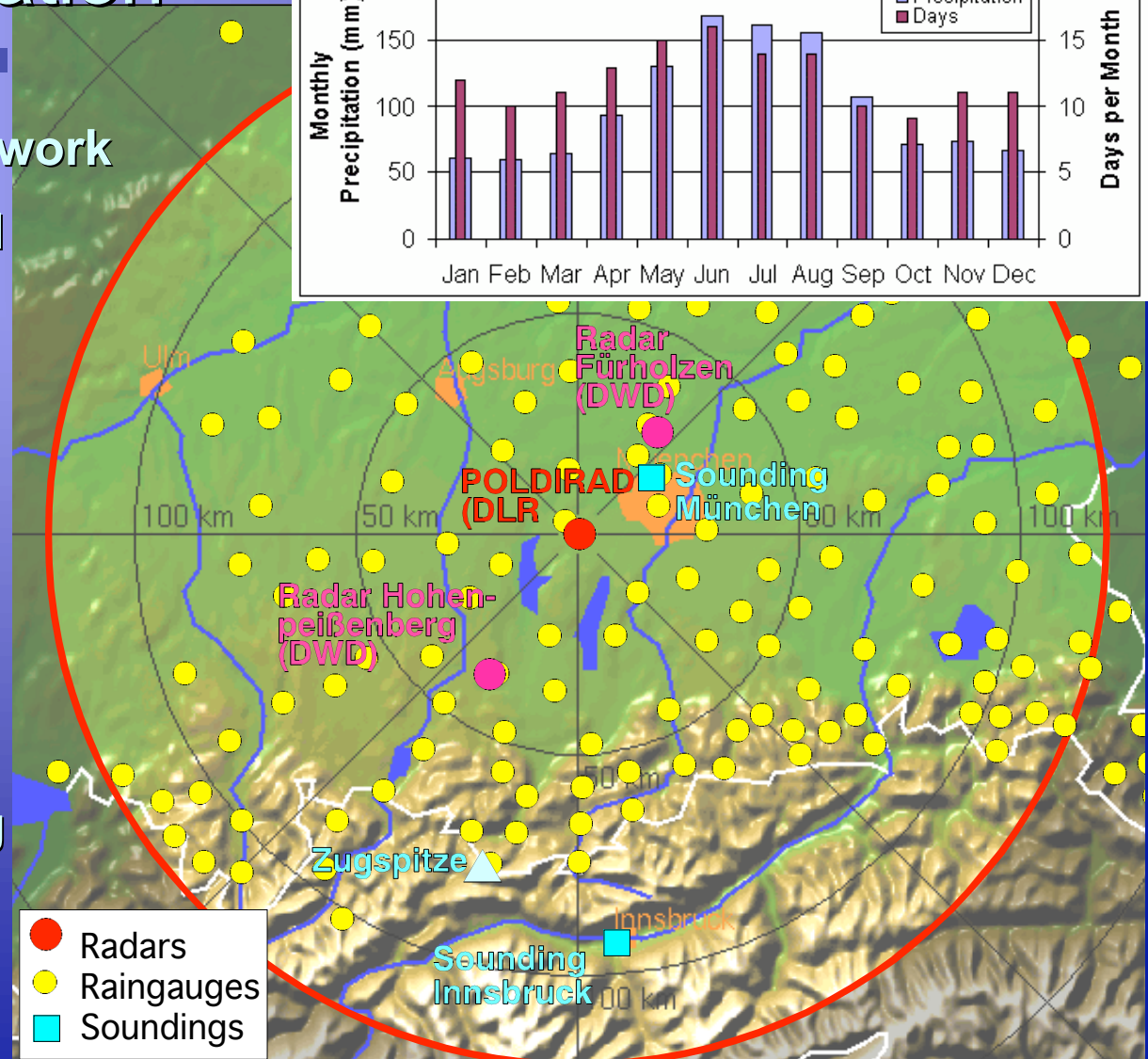
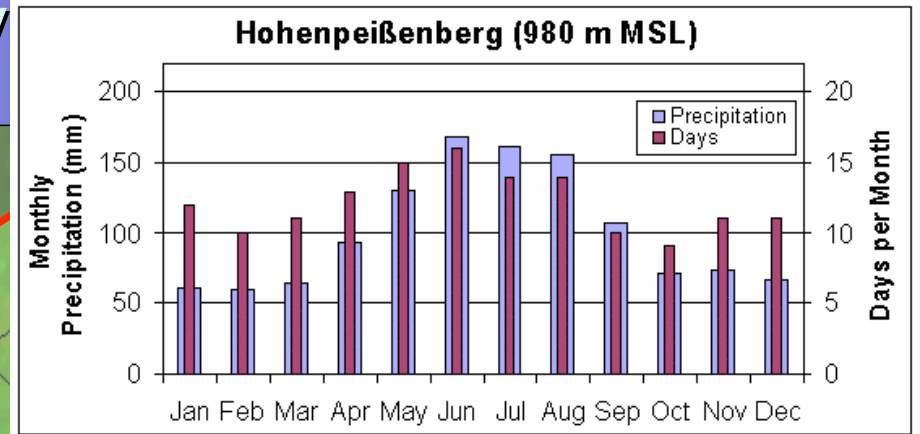


# Southern Germany Instrumentation

high change of precipitation during GPM overpath

## Dense observation network

- 3 polarimetric C-band Doppler radars
- Rain gauges, distrometers
- Radiosondes
- Meteorological institutions in:
  - Munich
  - Oberpfaffenhofen
  - Hohenpeißenberg
  - Garmisch-Partenkirchen
  - Zugspitze





- Oberpfaffenhofen  
DLR research site  
580 m MSL
- Hohenpeißenberg  
DWD radar&precip.  
research site  
988 m MSL
- Zugspitze  
GAW environmental  
research site  
2960 m MSL

## Munich-Alpine site



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